

OBSERVATIONS ON THE LIFE HISTORY OF THE BOTTLENOSE
PORPOISE.

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In the spring of 1886 I was requested by Professor Baird to investigate and report upon the porpoise fishery carried on at Hatteras, North Carolina. Some account of the fishery, in its industrial aspects, has already been published in the Bulletin of the U. S. Fish Commission.* I now desire to supplement that account by recording some observations which I made regarding the habits and structure of the porpoises themselves.

I reached the station in the middle of May and found that the fishing season was nearly at its close. Nevertheless active operations were still in progress, and several large hauls were made during my stay. I was hospitably entertained by Colonel Wainwright, who was in charge of the fishery, and from him as well as from the fishermen I gathered many interesting facts.

The species captured at Hatteras is *Tursiops tursio* (Bonnaterre). To the fishermen it is known simply as the porpoise.† The species is common along the entire Atlantic coast of the United States from Maine to Florida, and along the Gulf coast at least as far as Texas. It enters the Chesapeake Bay, and I have been informed that it occasionally ascends the Potomac River as far as Glymont, a fishing station on the Maryland shore, about 18 miles below Washington. I have never seen it myself, however, beyond Fortress Monroe, at the entrance of the bay.

For several days after my arrival at Hatteras no porpoises were taken and I began to fear that the season was closed. On the 14th of May, however, a school approached from the south, and the nets being cast, forty porpoises were taken. Of these twenty-six were males and fourteen females. The majority were full-grown individuals, and the smallest in the school had well-developed teeth. The largest individual measured 9 feet 10 inches in a straight line, and the smallest, 6 feet 7 inches.

* Vol. V, p. 3.

† Prof. Van Beneden, in his recent work on the Natural History of the Dolphins of Europe, states that the English call this species the "Bottlenose whale." This is, I believe, erroneous. The name Bottlenose whale is applied to *Hyperoodon*. (Hist. Nat. Delphinides des mers d'Europe, 1889, p. 178. Extr. Mém. Couron. de l'Acad. roy. de Belgique, XLIII.)

I measured the total length of eleven individuals of this school, including the two already mentioned, as they lay together on the beach; also, in eight cases, the length of the pectoral fin, or flipper, in a straight line along its center. The dimensions were as follows:

	Total length.		Length of flipper.
	<i>Fect.</i>	<i>In.</i>	<i>In.</i>
1	8	2	13
2	6	7	10½
3	8	11	14
4	9	5	14½
5	8	10	14½
6	7	4	12
7	8	7	14
8	9	0	14½
9	9	5	
10	9	9	
11	9	10	

The average length in this school was about 9 feet.

On the next day a second haul was made and twenty porpoises were captured. Of these ten were males and ten females. The largest individual measured 9 feet 4 inches in a straight line, and the smallest 5 feet 4 inches. The majority, however, as in the previous haul, were about 9 feet in length.

The nets were run out a second time on the same day, and the catch consisted of seventeen porpoises, of which nine were males and eight females.

After this time no more porpoises came sufficiently near the beach to enable the fishermen to encircle them with their nets, until May 19. Two hauls were made on that day. As a result of the first, fourteen porpoises were captured, of which six were males and eight females. I measured the total length of each, with the following result:

	Sex.	Total length.	
		<i>Ft.</i>	<i>In.</i>
1	Female	3	7
2	Male	4	5
3	Female	5	8
4	Male	6	2
5	Male	6	4
6	Male	7	2
7	Female	7	9
8	Female	7	10
9	Female	8	0
10	Female	8	1
11	Female	8	3
12	Female ..	8	6
13	Male	9	2
14	Male	9	3

All the females except the two smallest ones were in milk.

In the first two individuals included in this table the teeth had not cut through the gums.

When the nets were run out a second time on the same day sixty-six porpoises were taken, of which thirty-one were males and thirty-five females. These were mostly full-grown animals, having a length of about 8 feet. The largest measured 8 feet 5 inches, and the smallest 5 feet 3 inches. In the latter the teeth had pierced the gums. Nine of the females were in milk.

I have summed up in the following table the number of males and females taken in each haul, and the size of the largest and smallest individuals:

Date of haul.	Total No.	Males.	Females.	Largest.		Smallest.	
				<i>Ft.</i>	<i>In.</i>	<i>Ft.</i>	<i>In.</i>
May 14	40	26	14	9	10	6	7
May 15:							
First haul	20	10	10	9	4	5	4
Second haul ...	17	9	8				
May 19:							
First haul	14	6	8	9	3	3	7
Second haul....	66	31	35	8	5	5	3
Total	157	82	75				

Upon examining the figures in this table one is led to remark, first, the nearly equal division between the two sexes of the individuals in each group except the first; and, secondly, the great disparity in size and age among the individuals of each group.

In considering the bearing of these facts it should be remembered that the observations were made at the close of what the fishermen believe to be a northward migration. At such a time it is to be supposed that all the individuals, whether young or old, male or female, which had remained behind from various causes, would move northward together. The usual composition of the various herds or "schools" might be disturbed. The fishermen were of the opinion that such was the case. They stated that earlier in the season the schools were more homogeneous as regards age and sex, and that they had encircled some which were composed entirely, or almost entirely, of old males, and others of young males. They were of the opinion that the porpoises migrated northward in the spring and southward in the fall. They stated, however, that a few remained in the vicinity of Hatteras throughout the summer.

Colonel Wainwright informed me that the fœtuses found in the females captured in September were small, and that he had noticed a gradual increase in size as the season advanced. I do not doubt the correctness of this observation, but it appears to be true also that the

foetuses found at any specific date, as well as the young, vary considerably in size. Several of the females captured during my stay at Hatteras contained large foetuses, but they were not all of the same size. Two foetal skulls which I obtained on the same day measure 240 and 163 millimeters in length respectively. We have also noted above that the young individuals in the schools examined varied greatly in size. From these facts it would appear that although the birth of the young may be said in general terms to take place in spring, the breeding season extends over a considerable period. It is a well-known fact that among the terrestrial mammalia the southern representatives of those species which have an extensive range north and south breed earlier in the year than the northern representatives. Analogically it seems probable that the porpoises which habitually resort to the most southerly localities in autumn breed earliest in spring, while those that remain in more northerly parts during the winter breed later.

If this supposition is correct, it accounts perhaps for the disparity in age of the individuals in the different schools. One can readily imagine that during a migration individuals from different localities would meet and journey together, and that the young in quite different stages of development might be found in the same school.

The nursing females, as well as the gravid ones, are recognizable by the increased size of the abdominal region, due to the enlargement of the great milk glands.

The largest porpoise taken at the Hatteras fishery was 12 feet in length and yielded 24 gallons of oil. The average yield in winter is about 8 gallons, but the amount falls to 3 or 4 gallons later in the season.

My attention having been drawn to the question of the correlation between the condition of the teeth, the navel, and the hairs on the lip in young individuals, I made some special observations in the case of the five youngest porpoises captured May 19. The results obtained were as follows:

(1) Female.—Length, 3 feet 7½ inches. Color dark; lips dark. The lower portion of the shafts of the hairs were present, and projected slightly above the skin. No teeth had pierced the gums. The navel was indicated by a simple, distinct fissure about 1 inch long; its lateral margins were not raised above the surrounding integument.

(2) Male.—Length, 4 feet 5½ inches. Color light. The hairs had dropped out, leaving conspicuous depressions in the skin. No teeth visible. Umbilical fissure open, but only about one-fourth of an inch in length.

(3) Female.—Length, 5 feet 8 inches. Color light. Depressions marking the position of the hairs less conspicuous than in the last individual. Umbilical fissure obliterated. The teeth had pierced the gums, and protruded about a quarter of an inch; their crowns were sharp pointed.

(4) Male.—Length, 6 feet 2 inches. Hair-pits shallow, but distinct. Umbilical fissure obliterated. Teeth about one-half inch above the gums.

(5) Male.—Length, 6 feet 4 inches. Hair-pits still discernible and encircled with white. Umbilical fissure obliterated. Teeth about one-half inch above the gums.

It should be remarked that even in the largest individuals in this school the hair-pits were traceable.

In this species, when the mouth is shut, the teeth of the upper jaw fit into shallow pits in the integument of the lower jaw, situated just outside the lower tooth-row.

The color of the skin was, on the whole, remarkably uniform in all the individuals observed. The upper surfaces were of a clear, purplish lead-gray. This color faded out gradually, and was finally merged in the pure white of the under parts. I noticed, however, some minor variations in the disposition of the two colors. My observations were made chiefly upon the individuals taken in the second haul on May 19.

In some of these the white of the belly stopped abruptly opposite the eye, and narrow bands of slate-color, or plumbeous gray, coursed the breast from a point between the pectorals to the junction of their posterior margin with the body. On the sides of the head the dark color generally extends downward to the level of a line drawn between the corner of the mouth and the anterior base of the pectoral fin. If the lips are dark the boundary of the dark color of the head falls below the corner of the mouth. A dark ring around the eye is usually perceptible, and a line runs thence to the junction of the beak with the protuberance of the forehead. There is also a faint band running from this latter point along the median line to the blow-hole. On the sides the light color of the under parts rises somewhat higher immediately behind the pectoral fins than in the middle. Posteriorly its upper boundary slants downward to the genitals, which are included in the light-colored area. The lips have a yellowish cast.

The young, as already indicated on page 200, vary considerably as regards the depth of the gray color of the upper surfaces.

The porpoises which were hauled up on the beach made violent upward and downward strokes with the tail when disturbed. I could not perceive, however, that there was any independent sculling motion of the caudal fins themselves.

The fishermen informed me that the young porpoises remained near their mothers when the latter were entangled in the nets, as sometimes happens. I witnessed this in the case of one female, which became entangled quite near the beach. I did not, however, find the young porpoise among those captured. It probably escaped by diving under the net, as the adult porpoises often do.

Colonel Wainwright informed me that the mothers assisted their

young in their efforts to breathe by bearing them up to the surface of the water on their flippers, or otherwise. I did not observe this action myself.

The spiracle, or blow-hole, appears to be a sensitive part of the head. When I touched it with my hand the porpoises invariably showed signs of discomfort by lashing the tail violently.

The eyelids appeared to be as mobile as in the ordinary terrestrial mammalia. They were closed when the hand was brought near the



a



b

FIG. 1.—a, Pupil contracted; b, Pupil dilated.

eye. The iris of the eye is brown. The contraction and expansion of the pupil take place in a peculiar and remarkable manner, as shown in figure 1. When contracted the pupil takes the form of a semicircular line with the convexity downward. When expanded the aperture is wide, and has nearly the form of a half-ellipse. To produce these different effects, the lateral and lower parts of the iris remain nearly or quite stationary, while the superior portion is either drawn upward or allowed to drop downward.

These porpoises appear to be subject to disease and to encounter various accidents. Colonel Wainwright informed me that one porpoise taken at the fishery had a piece of cable lying across the mouth near the last tooth. There were evidences that it had originally been of considerable length and had trailed along the sides. In certain individuals some shot was found, and in one a portion of the sword of a sword-fish.

Among the porpoises which I examined, one had a deformed dorsal fin, and in another the end of the pectoral fin was twisted out of its natural plane and much thickened. All the porpoises were marked with fresh scratches and the scars of earlier ones. The males bore more of these marks than the females. One female had a diseased jaw; the skin of this part was tumid and bark-like, and of a white color. Many individuals have, besides scratches, certain smooth, circular, white blotches on the skin, which are apparently due to disease of parasitic origin.

Certain of the porpoises which appear in the spring are called "tassel-fins" by the fishermen. I discovered that these were individuals which bore on their fins a greater or less number of parasitic cirriped crustaceans of the genus *Xenobalanus*. The specimens which I collected are not now at hand, and I can not therefore state positively to what species they belonged. They appeared, however, to be *Xenobalanus globicipitis* of Steenstrup. Three or four of the porpoises taken May 19 were accompanied by these parasites. The fishermen informed me that the parasites were first seen in May or at the end of April, but did not know whether they could be found on the porpoises in summer. None are seen, however, when the fishing is resumed in the autumn.

The number of porpoises taken at Hatteras during the season of 1884-'85 was as follows :

November 15 to 31	246
December	89
January	36
February	111
March	219
April	264
May 1 to 15	303
Total	<u>1,268</u>